



SOKAL AND BRICMONT'S CRITIQUES OF POSTMODERNISM: A SYSTEMATIZATION

HENRIQUE NAPOLEÃO ALVES CORREIO¹

Abstract:

Sokal and Bricmont's criticisms of postmodernism contained in the work "Intellectual Impostures" provoked different reactions in many different countries. This article includes a review of the literature on these reactions and how they dialogue with different aspects of the work, and under different approaches. It also seeks to contribute to the existing literature with a systematisation that allows us to abstract, from Sokal and Bricmont's reflections on specific thinkers (Jacques Lacan, Julia Kristeva, Bruno Latour, Jean Baudrillard, Gilles Deleuze, Félix Guattari, etc.), their general critical ideas on postmodernism in general. This systematisation can be useful for analysing and understanding more recent thinkers and cultural movements that manifest, in whole or in part, the postmodern characteristics which were analysed and discussed by Sokal and Bricmont. This possibility justifies revisiting "Intellectual Impostures" more than two decades after its publication. The result may also be useful as supporting material in the study of the work and in the study of the thought of the thinkers who were criticised by Sokal and Bricmont. It can also be useful for those who wish to participate in the debate on postmodernism, either to criticise or to defend it. Its content may be of particular

¹ Doutor em Direito pela Universidade Federal de Minas Gerais. Diretor e Pesquisador-Chefe – Facts and Norms Institute (www.factsandnorms.com). Advogado e Consultor Jurídico – Comissão Interamericana de Direitos Humanos. Professor licenciado – Faculdade de Direito Milton Campos.

interest to scholars of philosophy and the history of thought, of general epistemology and the epistemology of the human and social sciences, of the sociology of science, and to those interested in the intersections between science, rationality and social emancipation.

Keywords: Postmodernism. Science Wars. Social Sciences. Humanities. Epistemology.

AS CRÍTICAS DE SOKAL E BRICMONT AO PÓS-MODERNISMO: UMA SISTEMATIZAÇÃO

Resumo:

As críticas de Sokal e Bricmont ao pós-modernismo contidas na obra “Intellectual Impostures” provocaram diferentes reações em diversos países. Este artigo inclui uma revisão da literatura sobre essas reações e como elas dialogam com diferentes aspectos da obra e sob diferentes enfoques. Procura também contribuir para a literatura existente com uma sistematização que nos permita abstrair, das reflexões de Sokal e Bricmont sobre autores específicos (Jacques Lacan, Julia Kristeva, Bruno Latour, Jean Baudrillard, Gilles Deleuze, Félix Guattari, etc.), quais seriam suas ideias críticas gerais sobre o pós-modernismo em geral. Essa sistematização pode ser útil para analisar e compreender pensadores e movimentos culturais mais recentes que também manifestam, no todo ou em parte, as características pós-modernas analisadas e discutidas por Sokal e Bricmont. Essa possibilidade justifica revisitar a obra mais de duas décadas após sua publicação. O resultado também pode ser útil como material de apoio no estudo da obra e no estudo do pensamento dos autores criticados por Sokal e Bricmont. Também pode ser útil para quem deseja participar do debate sobre o pós-modernismo, seja para criticá-lo, seja para defendê-lo. Seu conteúdo pode ser de particular interesse para a filosofia e a história do pensamento, a epistemologia geral e a epistemologia das ciências humanas e sociais, e a sociologia da ciência, bem como para pessoas interessadas nas interseções entre ciência, racionalidade e emancipação social.

Palavras-chave: Pós-modernismo. Guerras Científicas. Ciências Sociais. Humanidades. Epistemologia.

1. Introduction.
2. “Intellectual Impostures”: a systematization.
 - 2.1. The characteristics of post-modernism.
 - 2.2. Social roots of post-modernism and its disservice to the academy and to social struggles.
 - 2.3. Antidotes or alternatives to post-modernism (1): realist ontology, conception of science and status of human and social sciences.
 - 2.4. Antidotes or alternatives to postmodernism (2): general recommendations.
- 3 Concluding remarks.

1. INTRODUCTION

In the early 1990s a series of reflections and debates on science and rationality that became known as “science wars” took place in academia, particularly in the United States. In the context of these “science wars”, in 1996 the physicist Alan Sokal published, in the journal *Social Text*, an article entitled “Transgressing the boundaries: towards a transformative hermeneutics of quantum gravitation”. In this text, Sokal reproduced the critical discourse on science that had become popular in the humanities and social sciences of the developed West to argue, e.g., that quantum gravitation was only a social construction. The text, however, was deliberately nonsensical. Sokal’s aim was to test the academic rigor of those who aligned themselves with the “postmodern” side of the “science wars”. Its content mixed nonsensical phrases with apologies for postmodernism and a postmodern science. After his text was accepted and published by a then prestigious journal among the academic circles that were deemed sympathetic to postmodernism, Sokal revealed the intellectual “Trojan horse” he had sent to *Social Text* by means of the text “A Physicist Experiments with ‘Cultural Studies.’”

In the following year, Alan Sokal published the book “Intellectual Impostures”, co-authored with Jean Bricmont. The work focuses on the critique of postmodern relativistic conceptions of science, as well as the misuse of natural science categories and concepts by different thinkers associated with postmodernism, such as Jacques Lacan, Julia Kristeva, Paul Virilio, Gilles Deleuze, Félix Guattari, Luce Irigaray, Bruno Latour, and Jean Baudrillard.

“Intellectual Impostures” caused a great impact in the English and French-speaking intellectual milieu, having generated both favorable and contrary reactions. These reactions included pronouncements by well-known figures in the public debate of ideas, such as Noam Chomsky, Thomas Nagel, Richard Dawkins, and Jacques Derrida himself (the latter was among those who were expressly criticized by Sokal and Bricmont in “Intellectual Impostures”, as mentioned in the previous paragraph).

In the Spanish-speaking world, Antonio Lavolpe, e.g., establishes a conversation with Sokal and Bricmont’s critiques of postmodernism and its reception by the Argentine intellectual milieu, with emphasis on the critique of the postmodern adoption of a truncated language and its scientific ignorance. Anna Pi I Murugó and José Luis Ángeles each write their introductory review of “Imposturas intelectuales”. Both agree with Sokal and Bricmont in their denunciation of postmodern authors’ use of deliberately obscure and even meaningless language, as well as their misuse of concepts from the exact and natural sciences. Murugó also refers to the political context of the work and considers that postmodern ideas would be detrimental to the political left, which is also pointed out by Andrés Huergo. Quintín Racionero tries to defend the thinkers considered by Sokal and Bricmont as postmodernists from the criticisms directed at them. In this sense, Racionero argues that “Imposturas Intelectuales” would have treated different theories and currents of thought as if they were equivalent, grouping them under the same “postmodernist” label. Patricia Malone gives a brief analysis of “Intellectual Impostures”, referring to how the work questions the competence of “postmodern” authors in handling concepts from other fields of knowledge, the problem of transferring concepts from their original knowledge to other areas, and epistemological relativism. The author seems to agree with Sokal and Bricmont’s criticisms, but tries to point out that these criticisms say nothing about the processes of the origin of science, its insertion into state policies and the impact of its results on everyday life. Rubén Blanco deals with the “Sokal Affair” and the work “Intellectual Impostures” is set in the context of the so-called “science wars”, but focuses on the “Sokal Affair” and seeks to defend the legitimacy of social studies that question the demarcation between scientific and non-scientific knowledge. Raymundo Casas Navarro defends rational and objective criticism as the engine of scientific progress and distinguishes it from the hypercriticism associated with “intellectual impostures” such as postmodernism. Sonia Madrid Cánovas approaches the work of Sokal and Bricmont with a specific focus on language. In this sense, she refers to justified scientific language and the abuses of such language by “postmodernists” (e.g., misuse of concepts from the exact and natural sciences, truncated language, superficial erudition to intimidate readers, etc.).

In the Portuguese-speaking world, “Intellectual impostures” also generated reactions that, like the cited reaction of Jacques Derrida published in the newspaper *Le Monde*, were also present in the press, as documented by Jairo José da Silva and by Gabriel da Costa Ávila. Brazilian academic publications also refer to the critiques of postmodernism made by Sokal and Bricmont. In this sense, e.g., Valdemarin Coelho Gomes and Susana Jimenez examine the thought of Edgar Morin and confront it with Sokal and Bricmont’s critiques; Paulo Marcos Rona seeks to defend Jacques Lacan from the criticisms of Sokal and Bricmont, in particular the criticism of the misuse of categories of mathematics; Gabriel da Costa Ávila deals with “Intellectual Impostures” as part of the already mentioned “science wars” as a whole, especially the scientists’ reactions to the post-modern thought; André Assi Barreto establishes a dialogue with the main theses of “Intellectual Impostures” (i.e., the critique of relativism and the misuse of categories and concepts of the natural sciences) based on aspects of Sokal and Bricmont’s criticism of the thought of Lacan, Irigaray, Deleuze and Guatarri; André Moreira Fernandes Ferreira seeks to provide an introduction to Sokal and Bricmont’s philosophical critique of postmodernism from an approach focusing, in particular, on the concepts of “abuse”, “imposture”, “postmodernism” and “academic contexts”; and Georgia Araújo and Luana Araújo sought to defend Sandra Harding’s feminist epistemology from Sokal and Bricmont’s critiques of postmodernism.

The aforementioned reactions and various works had their particular approaches to the work of Sokal and Bricmont, as well as points of connection and divergence. The purpose of the literature review in the preceding paragraphs is not to pronounce on possible errors or successes of the cited texts, but to locate the present article among the different approaches which were taken and to clarify its contribution. In this sense, this article attempts to contribute to the existing literature with a systematization of Sokal and Bricmont’s work that allows us to abstract, from Sokal and Bricmont’s reflections on specific thinkers (Jacques Lacan, Julia Kristeva, Bruno Latour, Jean Baudrillard, Gilles Deleuze, Félix Guattari, etc.), their general and critical ideas on postmodernism in general.

The return to “Intellectual Impostures” and this exercise in abstraction are justified, some decades after its publication, by its usefulness in analyzing and understanding more recent thinkers and cultural movements - thinkers and movements that manifest, in whole or in part, the postmodern characteristics examined and discussed by Sokal and Bricmont. This is suggested, for instance, in the 2022 text by Alicia Delibes and the so-called “grievance studies affair” (a 2017-2018 project by authors James A. Lindsay, Peter Boghossian, and Helen Pluckrose aimed at creating spurious academic articles and submitting them to postmodern journals).

This article may also be useful as support material in the study of the work “Intellectual Impostures” and in the study of the thought of the postmodern thinkers criticized by Sokal and Bricmont, as well as for all those who intend to participate in the debate on postmodernism, either to criticize or to defend it. Because of its content, it may be of particular interest to scholars of philosophy and the history of thought, of general epistemology and the epistemology of the human and social sciences, of the sociology of science, and to all those interested in the possible intersections between science, rationality, and social emancipation.

The final text is the result of a philosophical investigation of the work which, in order to fulfil the general objective of understanding, systematizing and describing its authors’ ideas on postmodernism, followed a path that achieved the specific objectives of understanding and describing i) the general characteristics and intellectual and social roots of postmodernism; ii) the philosophical and socio-political critiques of postmodernism made by Sokal and Bricmont; iii) the antidotes or alternatives to postmodernism made by Sokal and Bricmont; iv) the philosophical and socio-political critiques of postmodernism made by Sokal and Bricmont; iii) the antidotes or alternatives to postmodernism presented by the authors - in particular, a realist ontology; a conception of science composed of minimal concerns with reasoning and experience; the defense of a proper, but rational and scientific, status for the humanities and social sciences; general recommendations, of a normative nature, to mitigate postmodern irrationalism.

2. “INTELLECTUAL IMPOSTURES”: A SYSTEMATIZATION

In the following topics, a descriptive systematization of “Intellectual Impostures” is made with the already mentioned aim to abstract what the authors think of postmodernism as a whole from specific, concrete, applied criticism of certain authors (a strong feature of the book). The systematization covers the general characteristics of postmodernism, the intellectual and social roots of postmodernism, how postmodernism is a disservice to progressive social struggles, and alternatives or antidotes to postmodernism. The descriptive nature of the systematization is evidenced by how the topics are faithful to the words and ideas of Sokal and Bricmont. Most of the time, these ideas were summarized and rearranged, as it would be expected from a systematization; sometimes, the summaries and rearrangements also included direct quotes from the authors when they were thought to be particularly condensed and meaningful. These also attest to the attempted faithfulness to the original text. In conclusion, a few comments were added to the descriptions, including references to other authors, when they were considered to be helpful. These are all easily identifiable.

2.1. THE CHARACTERISTICS OF POSTMODERNISM

If all discourses are merely 'stories' or 'narrations', and none is more objective or truthful than another, then one must concede that the worst sexist or racist prejudices and the most reactionary socioeconomic theories are 'equally valid', at least as descriptions or analyses of the real world (assuming that one admits the existence of a real world). Clearly, relativism is an extremely weak foundation on which to build a criticism of the existing social order. (SOKAL; BRICMONT, 2003, p. 196)

To understand Sokal and Bricmont's criticism of postmodernism, one must first consider in minute detail one of its most associated bases: relativism, especially cognitive relativism. Relativism is defined by the authors as "any philosophy that claims that the truth or falsity of a statement is relative to an individual or to a social group". On this basis, three types of relativism can be distinguished according to the nature of the statement in question: cognitive or epistemic relativism, when it is a statement of fact (i.e., of what exists or is deemed to exist); ethical or moral relativism, when it is a value judgment (of the good and the bad, the desirable and the objectionable); and aesthetic relativism, when it is an artistic judgment (of what is beautiful or ugly, pleasant or unpleasant).

For Bricmont and Sokal, relativism has a double origin that lies in the attempts of 20th century epistemology to codify the scientific method, and in its partial failure, leading, in some circles, to irrational skepticism, i.e. basically some version of the belief that either the external world does not actually exist, or it exists but does not allow one to reach reliable knowledge about it. While scientists try to achieve objective knowledge about aspects of the world, relativist thinkers dismiss the endeavor as an illusion and a waste of time.

Postmodernism is a term that designates a "complicated network of ideas" or an "ill-defined galaxy of ideas" whose difficulty of precise characterization makes Bricmont and Sokal prefer to take it as they take relativism, i.e., as a "nebulous *Zeitgeist*". The relationship between relativism and postmodernism goes beyond both being diluted in the culture as spirits of the age. Many postmodern authors flirt with some form of cognitive relativism or invoke arguments that may foster relativism. Moreover, the certain lack of intellectual rigor that usually marks the postmodern vein and relativism, although conceptually distinct, feed off each other; after all, as Sokal and Bricmont argue :

- "[I]f anything, or almost anything, can be read into the content of scientific discourse, then why should anyone take science seriously as an objective account of the world?"

- “Conversely, if one adopts a relativist philosophy, then arbitrary comments on scientific theories become legitimate.”

In addition to treating postmodernism as a diffuse spirit of the age, Sokal and Bricmont also define it. A more analytical and complete definition, however, interestingly comes also with an analysis of the book “Intellectual Impostures” as a whole, in search of the scattered items that best make up the mosaic. This is what I attempted to do. The result, what I could gather from the text, is as follows. Postmodernism can be understood as a philosophy or intellectual current adopted in the last decades, mainly by sectors belonging to the humanities and social sciences, whose adepts usually engage in the following practices:

- Adoption of an epistemic relativism coupled with a widespread skepticism about modern science that often culminates in anti-scientific attitudes.

- Affirmation of a cognitive and cultural relativism that regards science as a narrative, a myth, or a social construct.

- More or less explicit rejection of the rationalist tradition of the Enlightenment, including one of its most important features: distrust of argument from authority. Intellectual value measured constantly according to the author’s titles and status, and not according to the content of the speech or text. Almost religious veneration of the “great intellectuals”, who become international figures for sociological, not intellectual, reasons, particularly for the impact of their ability to manipulate far-fetched terms. Deep indifference or even contempt for facts, logic, and the canons of rationality and intellectual honesty.

- Theoretical elaborations disconnected from any empirical evidence. Emphasis on discourse and language as opposed to the facts to which they refer. Omission of the empirical aspect of science and an almost exclusive focus on theoretical formalism and language. Eventually rejection of the distinction between fact and fiction and even of the very existence of facts to which it is possible to refer; understanding of physical reality and social reality as linguistic and social constructs, and of the idea that there is an external world with properties independent of any individual human being and of humanity as a whole as a burlesque dogma (radical skepticism).

- Excessive interest in subjective beliefs regardless of their truth or falsity.

- Abandonment of clear thinking and rigorous, critical analysis of social realities in favor of nonsense and word games. Unnecessarily and deliberately obscure or difficult to access speeches, truncated jargon, style that is almost always heavy and pompous. Grandiloquent statements or catchphrases, ambiguous statements that are either truisms or radical (patently false) assertions. Repeated abuse of concepts and terms coming from the exact and natural sciences, which

includes: prolix talk about scientific theories of which the authors have, at best, a vague idea; arbitrary (and often metaphorical) use of scientific or pseudoscientific terminology with no major concern for meaning; incorporation, into the human or social sciences, of notions proper to the natural sciences without any kind of empirical or conceptual justification and in disregard of the autonomy of the human and social sciences themselves; analogies between well-established theories of the natural sciences and theories too vague to be empirically verified; use of avalanches of technical terms in a context in which they are absolutely incongruous, with the aim of displaying superficial erudition and of impressing and intimidating the reader; manipulation of meaningless phrases combined with a profound indifference to the meaning of words.

- Jumping from more or less reasonable and acceptable premises to illegitimate conclusions. This is what happens when criticism of actually criticizable social aspects concerning the way science is used (sexism, militarism, etc.) turns into a criticism of the intellectual endeavor that aspires to a rational understanding of the world as a whole, and its foundations.

Among the intellectual sources of relativism and postmodernism, Sokal and Bricmont include the neglect of the empirical. In short, according to them there is a legitimate criticism of empiricism when it is taken as an “allegedly fixed method for extracting theories from facts”. Such a conception is no more than a caricature, since science has always behaved as a complex interaction between observation and theory. Some postmodern texts, however, omit the empirical aspect of science altogether, as if for a discourse to be considered scientific it is enough that it exhibits, on the surface, an apparent coherence; as if discourses can do without empirical concerns and tests, as if it is enough, e.g., to insert mathematical formulas to advance research.

Another feature that is found among the intellectual sources of postmodernism is the confusion between science and scientism and the demoralization of science associated with it. Scientism is “the illusion that simplistic but supposedly ‘objective’ or ‘scientific’ methods will allow us to solve very complex problems.” When scientism is simultaneously confused with science and does not work, it opens the door to the demoralization of science, summarized in the following erroneous reasoning: “since the (simplistic, dogmatically adopted) method does not work, then nothing works, all knowledge is impossible or subjective, etc.”

Finally, the prestige of the natural sciences, stemming from their theoretical and practical successes, is often abused by scientists, and as a result science ends up having a distorted image - which contributes to the flourishing of an anti-scientific culture.

2.2. THE SOCIAL ROOTS OF POSTMODERNISM AND ITS DISSERVICE TO SOCIAL STRUGGLES

In addition to intellectual roots, Sokal and Bricmont consider the political origin of postmodernism. According to them, this origin is marked by the rise of new social movements, political discouragement with the left and the election of science as an easy target. From the 1960s and 1970s on, new social movements that denounced various forms of oppression, such as racism, sexism, prejudice against gay people, among others, gained more and more strength. These forms had been lamentably neglected or underestimated by the traditional left, which gave primacy or even exclusivity to economic and class struggles. The fact that this same traditional left has usually identified itself as the heir of the Enlightenment and the embodiment of science and rationality has caused some currents of the new social movements to understandably refuse or at least distrust science and rationality, and even to conclude that post-modernism is the philosophy that best responds to their aspirations. This is what explains why the left, characteristically identified with science and against obscurantism over the last two centuries, has been partly seduced by the post-modern discourse.

The conjuncture of despair and general disorientation of the left - resulting, for example, from the fall of the communist regimes; the application of neoliberal policies by the social democratic parties in power; the abdication, by third-world movements, of any attempt at autonomous development; and the hegemonization of the crudest form of free-market capitalism, converted into the implacable reality of the foreseeable future - also contributed to the flourishing of postmodern ideas.

Finally, there is also the issue of science being an easy target. In an atmosphere of general despondency, the chances are greater that people will be tempted to give up tackling the concentration of power and income because they think it is out of reach, and instead attack anything closer that is sufficiently linked to the establishment. As Noam Chomsky put it, there are many ways to run away from the real problems when they seem too difficult, and among them is the pursuit of meaningless chimeras and the adherence to academic cults that are divorced from any reality and that allow the adherent not to face the world as it is. Science is basically a tool that can be used either for emancipatory purposes or to promote and perpetuate injustices. And so, it has been. Postmodernism focuses on uses of the second kind, and allows the disillusioned an illusion of criticality, daring, rebellion against power, which in reality consists only in attacking one of the tools that, yes, has been used by it, but that can and should also very well be used against it.

While it is associated with the political left, postmodernism seems to have the following negative effects on the left:

I. Isolation of intellectuals. The persistence of confusing ideas and obscure discourses, the extreme focus on language, and the elitism linked to the use of truncated and pretentious jargon, characteristic of postmodernism, isolate intellectuals from social movements and lock them into sterile debates.

II. Ridicule of the left as a whole. Since the right does not pass up the chance to demagogically connect the left - in general - to postmodernism, postmodernist stances end up contributing to the discrediting of the left as a whole.

III. Student demobilization and waste of time and energy. Another negative effect concerns progressive university students: when they arrive at a university that to a large extent follows the post-modernist tone, they end up learning that the most radical thing, even from a political point of view, is to embrace integral skepticism and immerse themselves in textual analysis. With this, they end up wasting precious energy that in another context could very well be spent on research, organization, and mobilization activities.

IV. Harm to social critique and its propagation. No social critique can be established and disseminated based on a relativism that understands that every discourse is just another account or narrative, and if all discourses are equally valid, because this point of view implies admitting the validity of reactionary socioeconomic theories and racist and sexist prejudices, to name a few examples. In similar terms, it is logically impossible that social criticism can be made and can reach those who are not convinced beforehand, even more so when intellectuals, instead of demystifying the dominant discourses, are simply adding to the latter their own mystifications.

The negative effects of postmodernism are not limited to politics in general terms; they also reach the sciences, and among them, most dramatically, the social sciences. Here, too, the effects are serious and worrisome:

I. Damage to the critical analysis of society. Once the post-modern assumptions are adopted to the detriment of rational canons and the concern with empirical data, the critical and rigorous analysis of social realities ends up giving way to nonsense and word games that have nothing progressive about them.

II. Damage to education and intellectual culture. The abandonment of clear thinking, deliberately obscure discourses, and lack of intellectual honesty poison part of intellectual life: students learn to repeat and embellish speeches they hardly understand; with luck, some become professors, experts in the art of manipulating falsely erudite jargon. Moreover, they strengthen the facile anti-intellectualism already present among the public.

III. Irresponsibility in the face of obscurantism. Postmodernism gives up a rational world view, and thereby gives up the canons that have historically been

the main bastion against superstition, obscurantism, and nationalistic and religious fanaticism. Postmodern authors may not even intend to favor obscurantism, but this ends up being one of the consequences of their approach.

2.3. ANTIDOTES OR ALTERNATIVES TO POSTMODERNISM (1): REALIST ONTOLOGY, CONCEPTION OF SCIENCE, AND THE STATUS OF THE HUMANITIES AND SOCIAL SCIENCES

Besides characterizing and criticizing postmodernism, Sokal and Bricmont's text also proposes antidotes or alternatives to it, starting with a realist ontology as a starting point for a serious quest for knowledge of reality.

How is it possible to achieve objective knowledge about the world, even if it is only approximate and partial knowledge? How can we know that there is something outside our sensations, if what we have are sensations, and not a direct access to the world? With these questions, Sokal and Bricmont begin their reflection on the theme of epistemic relativism. It's a good starting point. These are basic questions that are part of the absurdity and wonder that is existence. In a reflection around the same theme, René Descartes famously formulated the concept of the evil genie or demon, an extremely intelligent, treacherous and powerful personification that would have directed all its efforts to deceive you through the illusion of an external world and a body that supposedly perceives or feels this phantasmal world. And more recently, celebrated entrepreneur Elon Musk caused a stir when he said that, given the exponential growth of technology, the chance of us being in the real universe, rather than a simulation, was one in a billion.

The answer given by Sokal and Bricmont is simple: we have no proof of the existence of the world, which, however, is a perfectly reasonable and intuitive hypothesis, because the most natural way to explain the permanence of our sensations consists in supposing that they come from something outside our consciousness. Our consciousness, our thought, can modify the sensations that are the product of our imagination, but it is not capable of stopping wars or setting an automobile in motion. Nevertheless, there is nothing to really guarantee that the solipsist is wrong. Solipsism is an irrefutable opinion, but this does not imply that there is the slightest reason to believe that it is a true opinion.

Next to it lies radical skepticism, formulated in the following terms: "Since I have access only to my sensations, the external world may exist, but I can never come to have reliable knowledge about it." Radical skepticism applies to all knowledge, even the most trivial knowledge of reality, such as knowing that there is a cat on the table, and it is in its universality that its weakness lies. The answer given to radical skepticism is also similar to that given to the solipsist: either our sensations

systematically deceive us, or they are really produced by things outside ourselves. The best way to explain the coherence of our experience consists in supposing that the external world can be, at least in an approximate way, known to us from the outside.

Having put aside solipsism and radical skepticism, and having admitted the possibility of obtaining some more or less reliable knowledge about the world, we are left to ask: how does or can this happen? Sokal and Bricmont's answer is that it is possible to compare sensory impressions with each other and vary the parameters of our experience every day, thus gradually building up a practical, habitual rationality, which, strengthened by systematicity and sufficient precision, gives rise to science. The same basic methods of induction, deduction, and evaluation of data that make up the rational attitude are present in everyday life knowledge and scientific knowledge, which differs fundamentally only in that it pursues the same intent in a more careful and systematic manner, with more precise measurements than those of everyday observations. Science occasionally contradicts common knowledge - as when it explains water in terms of its atoms and not as the continuous fluid it appears to the ordinary senses - but this is more properly in the results or conclusions than in the means or basic approach. There is a continuity between science and common knowledge, which, on the other hand, does not imply denying that science introduces concepts that are difficult to grasp intuitively or connected with common sense notions.

Sokal and Bricmont argue that although it is not possible to achieve a complete codification of scientific rationality, it is correct to say that science is characterized by general epistemological principles (such as distrust of aprioristic arguments, revelation, and authority arguments) and by more or less general methodological principles (such as the repetition of experiments, the use of control mechanisms, the application of double-blind procedures, etc.) that can be justified by means of rational arguments. Well-developed scientific theories are based on good arguments. There are no absolute or circumstance-independent criteria of rationality, nor a general justification for the principle of induction, but it is still clearly possible to distinguish justified and unjustified inductions in each case. No statement about the real world can be demonstrated literally, but it can be demonstrated beyond a reasonable doubt. To illustrate what they argue, Sokal and Bricmont use an example intermediate to scientific knowledge and common knowledge: police investigations. Almost always, the investigation infers the unobserved (who committed the crime) from the observed (the evidence and evidence collected, etc.) and, as in the case of science, there are more and less rational inferences. Although there is no way of deciding what distinguishes a priori a good investigation from a bad one, that is, regardless of the circumstances, there is no doubt about the relevance of some rational, non-arbitrary rules and procedures, based on a detailed analysis of

previous experience and including, e.g., distrust of confessions obtained by violence or torture, comparison of testimonies, confrontations, search for tangible evidence, etc.

How do the humanities and social sciences fit into this context? And how should they relate to the natural sciences? The answer that can be derived from Sokal and Bricmont's reflections is that the sciences are autonomous from each other while they can benefit from the same general principles. It is important that autonomy is recognized, just as it is important to recognize what different sciences have in common or can have in common. Science has always behaved as a complex interaction between observation and theory. With the discarding of aprioristic arguments, authority arguments, and reference to sacred texts, what remains is the systematic confrontation of theories with observations and experiments. Every theory needs the support, at least indirectly, of empirical arguments. The scientific attitude, understood in a broader sense as respect for the clarity and logical coherence of theories and their confrontation with empirical data, is pertinent to both the natural sciences and the social sciences.

This should not be confused with disrespecting the autonomy of the sciences. Social and human sciences and natural sciences each have their own methods and problems, so there is no need for one to try to copy the other. One has to be careful with the social sciences' claims to scientificity because the problems they deal with are extremely complex and the empirical data supporting their theories are often much weaker.

But one may go further. It is natural to introduce a hierarchy in the degree of credence accorded to different theories, depending on the quantity and quality of the evidence supporting them. Every scientist – indeed, every human being – proceeds in this way and grants a higher subjective probability to the best-established theories (for instance, the evolution of species or the existence of atoms) and a lower subjective probability to more speculative theories (such as detailed theories of quantum gravity). The same reasoning applies when comparing theories in natural science with those in history or sociology. For example, the evidence of the Earth's rotation is vastly stronger than anything Kuhn could put forward in support of his historical theories. This does not mean, of course, that physicists are more clever than historians or that they use better methods, but simply that they deal with less complex problems, involving a smaller number of variables which, moreover, are easier to measure and to control. It is impossible to avoid introducing such a hierarchy in our beliefs, and this hierarchy implies that there is no conceivable argument based on the Kuhnian view of history that could give succor to those sociologists or philosophers who wish to challenge, in a blanket way, the reliability of scientific results. (SOKAL; BRICMONT, 2003, p.72-73)

A certain relativistic attitude may even be methodologically natural in some social science disciplines. In this sense, e.g., a researcher who seeks to understand

certain tastes and customs will gain nothing by inserting his own aesthetic preferences into the research; and research that seeks to understand the way in which cosmological beliefs operate in a given culture dispenses with judging the veracity or falsity of the beliefs involved. What is not correct is that this reasonable methodological attitude should, because of linguistic and thought confusions, turn into a radical cognitive relativism, defined by Sokal and Bricmont as the thesis that statements of fact can be considered true or false only in relation to a particular culture.

An example of this concerns two accounts of the origin of Native American peoples: the scientific one, founded on numerous archaeological data, claims that the ancestors of Native Americans came from Asia, crossed the Bering Strait and reached the continent some twenty thousand years ago; and a shared myth according to which these ancestors came from an underground world inhabited by spirits. A radical cognitive relativist would argue that both accounts are equally valid as ways of knowing the world. However, philosophy and everyday language distinguish knowledge (roughly understood as true, justified belief) from belief pure and simple. Relativist anthropologists claim to deny the distinction between knowledge and mere belief. They also claim to deny the possibility that cognitive beliefs about the external world are objectively (or cross-culturally) true or false. But the assertion that millions of Amerindians were killed during the European invasion, for example, is not, or should not, be merely a belief fit to be true only among some individuals of some cultures.

As stated earlier, postmodernism often starts from legitimate points to reach illegitimate conclusions, especially in the field of science criticism. For Sokal and Bricmont, it is essential to distinguish at least four different senses for “science”: intellectual endeavour which aspires to a rational understanding of the world; a set of accepted theoretical and experimental ideas; a social community with its own traditions, institutions, and social bonds; applied science and technology. The confusion between the meanings may cause a justified criticism to become an unfounded criticism of science. In this sense, it is undeniable that, as a social institution, science is linked to political, economic and military power and that often the social function performed by scientists is pernicious. It is also true that technology has contradictory effects, ranging from disaster to miracle, and that science, as a body of knowledge, is not only fallible but that sometimes scientists’ errors stem from all kinds of social, political, philosophical or religious prejudices. All these can be valid and welcome criticisms, if there is no confusion between the different senses of science. However, as Bricmont and Sokal point out, unfortunately some criticisms go beyond attacking the worst aspects of science (militarism, sexism, etc.) to attack its most positive aspects: the attempt to achieve a rational understanding

of the world and the scientific method, understood in a broad sense as respect for empirical data and logic.

The idea that truth, including scientific truth, always derives from “regimes of truth” inextricably linked to power basically reflects a huge exaggeration from something real. There is a certain truism that systems of power do cause some effect on how science proceeds. An extreme example of this is Stalinist biology. There are others: the influence of companies in drug testing, the professional limits imposed on academics themselves etc. All this is true. Noam Chomsky himself, for example, suffered this in the flesh, when he could not publish, in the 1950s, his first book because its content conflicted with ideas accepted at the time. In short, all this is real, but it does not reflect the whole practice of science. These are marginal events, and there are self-corrective procedures that are not perfect, but work reasonably well.

The naive modernism that believes in an indefinite and continued progress; scientism; cultural eurocentrism; these are all open for criticism. To denounce them, however, does not and should not necessarily lead to a rejection of rationality. In fact, such rejection would be a contradiction, because the criticism of prejudices in science presupposes rational canons:

In particular, the critiques of science viewed as a body of knowledge – at least those that are most convincing – follow, in general, a standard pattern: First one shows, using conventional scientific arguments, why the research in question is flawed according to the ordinary canons of good science; then, and only then, one attempts to explain how the researchers’ social prejudices (which may well have been unconscious) led them to violate these canons. One may be tempted to jump directly to the second step, but the critique then loses much of its force. (SOKAL; BRICMONT, 2003, p.191, 191 fn.270, 192)

Science and rationality are also easy targets for postmodernism because, in the matter of attacking reason, there is no lack of allies. All those who believe in traditional or modern superstitions can be rallied against science and reason. The attack on reason turns out to be a relatively popular, though not progressive, struggle. It ends up being a real shot in the foot though, because “it is precisely the emphasis on objectivity and verification that offers the best protection against ideological bias masquerading as science”. Those who hold political and economic power win, because they prefer rationality, science, and technology to suffer attacks; in such a scenario, they win twice: with the concealment of the power relations on which their power is founded, and with the political left’s failure to use rationality, a powerful instrument to criticize the social order.

2.4. ANTIDOTES OR ALTERNATIVES TO POSTMODERNISM (2): GENERAL RECOMMENDATIONS

In addition to realist ontology, the conception of science as continuous in relation to common sense and composed of minimal concerns with reasoning and experience, and how this relates to the humanities and social sciences, Sokal and Bricmont also present some general recommendations which, if adopted, could mitigate postmodern practice:

I. Do not make arbitrary statements. No one is obliged to speak about the natural sciences, but those who want to do so need to know what they are talking about, need to be well informed on the subject so that they do not end up supporting arbitrary statements. "There is nothing to stop one being a psychologist or a philosopher and talking about natural sciences knowingly, or not talking about it and occupying oneself with other needs." There is no shame in, e.g., ignoring infinitesimal calculus or quantum mechanics. The problem is to claim to know them when, at best, there is a fairly basic knowledge, comparable to the level of science popularization works for the general public.

II. Do not confuse obscurity with depth. There is a huge difference between speeches that are difficult to access, by the very nature of the subject matter, and those in which a deliberate obscurity of the prose is used to conceal emptiness or banality. In the first case, the author can respect the reader's authentic difficulties and help him through an attempt to explain, in simple terms, at an elementary level, what are the phenomena that a given theory intends to analyze, its main results and the strongest arguments in its favor; and by pointing out a clear path, even if it is a long one, that allows the interested reader a deeper knowledge of the topic in question. In the second case, however, the author ends up giving the reader the impression that, in order for him to achieve some understanding of the text, a kind of qualitative leap will be necessary, an almost religious experience of revelation, or something similar.

III. Do not take science as text without context. The natural sciences are not a repository of metaphors to be used in the human sciences; their terms cannot be analyzed in a purely verbal way. Scientific theories are not novels; there is a scientific context in which each of the terms has a precise meaning that differs from possible everyday meanings, understandable only within a "complex interplay between observation and theory". Ignoring the context to use terms metaphorically can lead to meaningless conclusions (for example, judging that the terms "discontinuity" and "interconnectivity", proper to quantum mechanics, are contradictory, when in fact, within the scientific theory in question, they are not).

IV. Respect the autonomy of the social sciences and the natural sciences. There is no need for the social sciences to follow every paradigm shift, real or imaginary, of the natural sciences. Both are autonomous, they have their own problems and methods.

V. Distrust of Authority Arguments. Instead of misappropriating the technical concepts of the natural sciences, the human sciences can draw inspiration from the positive aspects of their methodological principles, such as distrust of authority, an Enlightenment legacy, and the idea that we should measure the validity of a proposition according to the facts and the reasoning behind it, and not on the personal characteristics or social status of its critics or defenders.

VI. Distinguish specific skepticism from radical skepticism. Criticism of science anchored in radical skepticism is irrefutable and uninteresting because of its universality, for if one wants to contribute to knowledge, to science, whether natural or social, one needs to abandon radical doubts about the viability of logic or the possibility of the world being known through observations or experiments. More interesting are the critiques that adopt not a radical skepticism, but a specific skepticism that allows for refutation.

VII. Do not use ambiguity as a subterfuge. Among postmodern texts, there are many ambiguous passages that allow both an interpretation that has them as true but relatively banal statements, or truisms, and an interpretation that has them as radical but effectively and manifestly false statements. It is possible that in many cases ambiguities have been deliberately generated, because they offer the great advantage of attracting less experienced readers with the radical statements, while allowing the author a refuge for the banal interpretation if the absurdity of the radical interpretation is highlighted by any critic. Avoiding them is a great antidote to postmodernist discourse.

3. CONCLUDING REMARKS

The previous topics allows us to attend in a substantiated way to the general objective of the article: to abstract, understand, systematize, and describe the main ideas about postmodernism contained in the work of Sokal and Bricmont. From what has been examined and discussed, the following points of synthesis and conclusion are presented:

3.1. Postmodernism can be understood as a certain spirit of the times that is particularly popular in the humanities and social sciences. Its adherents usually engage in the following practices: (i) adoption of a cognitive relativism and a generalized skepticism regarding modern science, often understood as narrative, myth or social construction; (ii) rejection of the Enlightenment and indifference or

contempt for facts, logic and the canons of rationality; (iii) theoretical elaborations disconnected from empirical evidence and even rejection of the distinction between fact and fiction; iv) the abandonment of clear thinking and the critical and rigorous analysis of social realities in favor of word games, obscure discourses, truncated jargon, catchphrases and ambiguous statements; v) the repeated abuse of concepts and terms from the exact and natural sciences and the incorporation of notions from the natural sciences without any kind of empirical or conceptual justification; vi) the leap from acceptable premises to illegitimate conclusions (e.g., from the critique of sexism or militarism in science to the rejection of the very enterprise of rational understanding of the world); vii) a tendency to venerate, almost religiously, intellectuals skilled in the manipulation of far-fetched terms.

3.2. Among the intellectual roots of postmodernism are: i) the limits of 20th century epistemology's attempts to codify science and the scientific method; ii) the vulgar empiricism that favors relativistic postures that dispense with empirical concerns and tests; iii) the confusion between science and scientism (i.e. the illusion that certain simplistic but supposedly scientific methods can resolve highly complex problems); iv) the abuse of the prestige of the natural sciences, stemming from their theoretical and practical successes, which gives science a distorted image and fosters the growth of an anti-scientific culture.

3.3 From the 1960s and 1970s, new social movements denouncing oppression based on race, gender and sexual orientation gained more and more strength. The traditional political left, however, was seen as concerned only with economic struggles. Since it was also identified with the Enlightenment promises of rational emancipation of man, some currents of the new social movements began to refuse or distrust science and rationality because they also distrusted the traditional political left. This would be one of the social roots of postmodernism, which also benefited from the conjuncture of despair and general disorientation of the political left after the fall of the communist regimes, the adoption of neoliberal policies by social democratic governments and the hegemony of free-market capitalism. People disillusioned with the possibility of socio-economic change received from postmodernism the chance to set themselves up as rebels against the power wrongly identified with rationality and science (the latter tools which, as such, could be used both to maintain and to modify the prevailing power structures).

3.4. Despite being associated with the political left, a "new left", postmodernism seems to provoke negative effects on all those concerned with social transformation, among them: (i) the isolation of intellectuals from social struggles by virtue of their elitism, truncated language and extreme focus on language disputes; (ii) the ridicule of the political left as a whole by virtue of its identification, by its political opponents, with postmodernist extremes; (iii) student demobilization, as

the postmodernist university environment teaches progressive students that the most radical thing would be to embrace integral skepticism and textual analyses iv) harm to social critique and its dissemination, since, if for postmodernism there are only discourses or narratives of equal validity, it becomes difficult or impossible to convince society that discourses of social transformation should prevail over racist, sexist or classist discourses; v) harm to the critical analysis of society with the replacement of rational and empirical studies of social realities by word games; vi) harm to education and culture as a result of the abandonment of clear thinking and the adoption of deliberately obscure language; vii) harm to the fight against obscurantism, superstition and nationalist and religious fanaticism as a consequence of the abandonment or discrediting of reason and science.

3.5. Sokal and Bricmont consider postmodernism pernicious for the above reasons, and propose antidotes or alternatives to it, such as: (i) a realist ontology as the starting point for a serious endeavor in the search for knowledge of reality; (ii) the defense and adoption, as far as possible, of epistemological principles such as distrust of aprioristic arguments, revelation and authority arguments; and of rationally justifiable methodological principles such as the repetition of experiments, the use of control mechanisms, the application of double-blind procedures etc. iii) respect for the autonomy of the humanities and social sciences vis-à-vis the natural sciences, given the differences in object and complexity between them, without denying the possibility of unity among the various sciences around basic principles of rationality; and, finally, iv) general recommendations of a normative or behavioral nature for those who engage in intellectual and academic endeavors, including not making arbitrary assertions, not confusing obscurity with profundity, not abusing concepts from other branches of knowledge, respecting the autonomy of the social sciences and natural sciences, cultivating mistrust of authority arguments, not confusing skepticism with radical skepticism, and not using ambiguity as a subterfuge.

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